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Docket N80097JDP
Customer No. 01333

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of

Yee S. Ng, et al.

EDGE ENHANCEMENT OF GRAY LEVEL IMAGES

Serial No. 09/629,696

Filed August 01, 2000

Group Art Unit: 2624

Examiner: James A. Thompson

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Debra Nowacki

Debra Nowacki

November 28, 2005

Date

Mail Stop APPEAL BRIEF-PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

APPEAL BRIEF TRANSMITTAL

Enclosed herewith is Appellants' Appeal Brief for the above-identified application.

The Commissioner is hereby authorized to charge the Appeal Brief filing fee to Eastman Kodak Company Deposit Account 05-0225. A duplicate copy of this letter is enclosed.

Respectfully submitted,

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Enclosures

If the Examiner is unable to reach the Applicant(s) Attorney at the telephone number provided, the Examiner is requested to communicate with Eastman Kodak Company Patent Operations at (585) 477-4656.

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APPEAL BRIEF PURSUANT TO 37 C.F.R. 41.20(b)(2)

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Table Of Contents

APPELLANTS' BRIEF ON APPEAL

Appellants hereby appeal to the Board of Patent Appeals and Interferences from the Examiner's Final Rejection of Claims 1-8 and 10-24 which was contained in the Office Action mailed June 29, 2005. A timely Notice of Appeal was filed on October 28, 2005 with a Petition for a one-month extension of time.

I. Real Party In Interest

Eastman Kodak Company is the real party in interest.

II. Related Appeals And Interferences

No appeals or interferences are known which will directly affect or be directly affected by or have bearing on the Board's decision in the pending appeal.

III. Status Of The Claims

Claims 1-8 and 10-24 are pending, with Claims 1, 13, 20, and 21 in independent form. Claim 9 was cancelled by the Amendment filed November 1, 2004 without prejudice or disclaimer of the subject matter presented therein. Claims 1-8 and 10-24 stand rejected by the most recent Office Action dated June 29, 2005, which has been marked "final." Appellants hereby appeal the rejections of Claims 1-8 and 10-24. Appendix I provides a clean copy of the claims on appeal.

IV. Status Of Amendments

No amendments were submitted subsequent to the June 29, 2005 final Office Action.

V. Summary of Claimed Subject Matter

Independent Claim 1 requires a method for processing image data. The method includes providing rasterized color separated contone gray level image data (RIP Data); subjecting the RIP Data to halftone screen processing to form halftone processed screen image data; and analyzing a current pixel of the halftone processed screen image data to a test criterion to determine if the current pixel is a possible saturated color text image. Claim 1 additionally requires that if the current pixel meets the criterion for being a pixel of a possible saturated color text image, then the gray level image enhanced processing modification of the current pixel is selected for output to a printer or display. Further, according to Claim 1, if the current pixel does not meet the test criterion for being a pixel of a possible saturated color text image, then the current pixel gray level value as processed by the halftone screen processing is selected for output to a printer or display. Support for Claim 1 may be found in the specification at least at page 6, line 31 to page 7, line 5; page 7, lines 16-17; and page 8, line 24 to page 9, line 24, which is described with reference to FIG. 1. However, Claim 1 is not limited to the details of this embodiment, which is referred to for purposes of illustration only.

Independent Claim 13 requires a method for processing image data that includes providing rasterized color separated contone gray level image data (RIP Data); subjecting the RIP Data to plural separate halftone screen processings to form plural separate halftone screen processed gray level image data; and analyzing a current pixel of the first gray level image data for contrast index. In response to the analyzing, Claim 13 includes generating blending coefficients for processing that current pixel. Claim 13 also includes processing the plural separate halftone screen processed image data with the blending coefficients to blend halftone screen processed gray level image data of the same current pixel to form a blended halftone screen processed gray level current pixel. Additionally, Claim 13 includes comparing the gray level of the blended halftone screen processed current pixel relative to a threshold criterion. According to Claim 13, if the gray level of the blended halftone screen processed current pixel meets the

threshold criterion, a gray level image enhanced processing modification of the current pixel is provided for output to a printer or display. Also according to Claim 13, if the gray level of the blended halftone screen processed current pixel does not meet the threshold criterion, the current pixel gray level as processed by the halftone screen processing is provided for output to a printer or display. Support for Claim 13 may be found in the specification at least at page 6, line 31 to page 7, line 5; page 7, line 16 to page 8, line 5; and page 8, line 24 to page 9, line 24, which is described with reference to FIG. 1. However, Claim 13 is not limited to the details of this embodiment, which is referred to for purposes of illustration only.

Independent Claim 20 requires an apparatus for processing image data. The apparatus includes a raster image processor for providing rasterized color separated contone gray level image data (RIP Data); first and second halftone screen processing devices that form plural separate halftone processed screen gray level image data from the RIP Data; and an input to each of said screen processing devices to input image data representing a current gray level pixel. The apparatus also includes a device for analyzing the current pixel for contrast index; a device responsive to the contrast index for generating blending coefficients; and a blending operation processor that generates a blended halftone data output for the current pixel. Additionally, the apparatus includes an input at the blending operation processor for inputting respective outputs of the first and second halftone screen processing devices and the blending coefficients; and a gray level image enhancement processing device connected to the output of the blending operation processor. Further, the apparatus of Claim 20 includes a detector for examining the current pixel after operation by the blending processor and neighboring pixels thereof after operation of the blending processor and determining if the current pixel and such neighboring pixels represent a substantially binary image file and generating a signal relative to such determination. Further still, the apparatus of Claim 13 requires a selector, responsive to the signal, that selects either the gray level image enhancement processing device output or a bypass representing a blended halftone data output. Support for Claim 20 may be found in the specification at least at page 6, line 31

to page 7, line 5; page 7, line 16 to page 8, line 5; and page 8, line 24 to page 9, line 24, which is described with reference to FIG. 1. However, Claim 20 is not limited to the details of this embodiment, which is referred to for purposes of illustration only.

Independent Claim 21 requires a method for processing image data. The method of Claim 21 includes providing rasterized color separated contone gray level image data (RIP Data); subjecting the RIP Data to plural separate halftone screen processings to form plural separate halftone screen processed gray level image data; and blending halftone screen processed gray level image data of the same current pixel to form a blended halftone screen processed gray level value current pixel. According to Claim 21, if the blended halftone screen processed gray level value current pixel is substantially a maximum density pixel or is adjusted to be a substantially maximum density pixel, the blended halftone screen processed gray level current pixel is subjected to a gray level image enhanced processing modification to reduce jaggedness in an image. Support for Claim 21 may be found in the specification at least at page 6, line 31 to page 7, line 5; page 7, line 16 to page 8, line 5; and page 8, line 24 to page 9, line 24, which is described with reference to FIG. 1. However, Claim 21 is not limited to the details of this embodiment, which is referred to for purposes of illustration only.

VI. Grounds of Rejection to be Reviewed on Appeal

The grounds of rejection for review are:

A. the rejection of Claims 1 and 8 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,742,703 (Lin) in view of U.S. Patent No. 5,832,301 (Yamaguchi);

B. the rejection of Claim 10 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Yamaguchi and U.S. Patent No. 5,710,824 (Mongeon);

C. the rejection of Claim 11 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Yamaguchi, Mongeon, and U.S. Patent No. 5,694,224 (Tai);

D. the rejection of Claim 12 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Yamaguchi and U.S. Patent No. 5,574,833 (Yoshiaki);

E. the rejection of Claims 2-7, 11, 13-15, 19, and 21-24 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Yamaguchi and Tai;

F. the rejection of Claims 16-18 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Yamaguchi, Tai, and Mongeon; and

G. the rejection of Claim 20 under 35 U.S.C. §103(a) as being unpatentable over Lin in view of Yamaguchi and Tai, and further in view of In re Dulberg (289 F.2d 522, 523, 129 USPQ 348, 349 (CCPA 1961)).

VII. Arguments

Claims 1-8 and 10-24: None of the Cited References, Taken Separately or in Any Proper Combination, Teach or Suggest Analyzing a Current Pixel of the Halftone Processed Screen Image Data to a Test Criterion to Determine If the Current Pixel is a Possible Saturated Color Text Image

A notable feature of Claim 1 is "analyzing a current pixel of the halftone processed screen image data to a test criterion to determine if the current pixel is a possible saturated color text image . . . ." "[I]f the current pixel meets the criterion . . . gray level image enhanced processing modification of the current pixel [is selected] for output . . . ." Claim 1. Otherwise, "the current pixel gray level value as processed by the halftone screen processing [is selected] for output . . . ." Claim 1. Support for this feature may be found in the specification at least at page 8, line 24, to page 9, line 24, which is described with reference to FIG. 1. As described in this portion of the specification, this feature is useful for performing gray level image enhancement processing for portions of an image deemed to pertain to saturated color text. Non-saturated color text portions of the image do not receive this gray level image enhancement processing. (It is to be noted that Claim 1 is not limited to the details of this embodiment, which is referred to for purposes of illustration only.)

In order to determine whether a current pixel being analyzed is part of a saturated color text portion of an image, Claim 1 requires that halftone processed screen image data be analyzed. See Claim 1 ("analyzing a current pixel of the halftone processed screen image data to a test criterion to determine if the current pixel is a possible saturated color text image . . . ."). An advantage of analyzing halftone-processed data is that the determination of whether a saturated color text portion of an image is present may be performed simply by determining whether the current pixel region is substantially binary, i.e., does not include any gray values (in a range). See page 9, lines 10-24 of the specification. For example, if an image being analyzed is an 8-bit image, each pixel may have a gray value of 0 to 255. One example of a test for determining whether the current pixel region is substantially binary, which is a characteristic of text, is to define

"substantially binary" as only including pixels with a gray level less than 10 or greater than 245. In this example, if a pixel in the current pixel region has a grey value between 10 and 245, inclusive, the pixel is determined not to be part of a saturated color text image. See page 9, lines 11-15 of the specification ("the detector 26 would also determine whether there are other values than the binary . . . that exist within the window of examination. If there are other gray values within that window, the bypass gray values (blended halftoned values as output by blending operation processor 24) will be used instead."). (As stated before, it is to be noted that Claim 1 is not limited to the details of this embodiment, which is referred to for purposes of illustration only.)

The Lin patent, on the other hand, is understood to disclose processing image data in two channels, a Channel A for text-like data and a Channel B for other data. See col. 7, lines 2-9 and col. 8, lines 40-47, which is described with reference to FIG. 2. In contrast to Claim 1, the Lin patent is understood to determine whether a current image region is text in Channel A by binarizing gray-scale image data and then performing pattern matching on the binarized image region. See col. 7, lines 13-17, 33-46, and 56-62, and col. 8, lines 18-27 and 38-47, which is described with reference to FIGS. 2 and 4. If a match is found, the current image region is deemed to be a text or line art region. See col. 7, lines 56-58 and col. 8, lines 42-47. Appellants respectfully submit that the pattern matching, according to the Lin patent, is performed on binary pixel data, and not halftoned data. Accordingly, the Lin patent is not understood to teach or suggest analyzing a current pixel of *halftone processed screen image* data to a test criterion to determine if the current pixel is a possible saturated color text image, as required by Claim 1. (emphasis added). Further, Appellants respectfully submit that this distinction is important because analyzing halftone processed screen image data can be used to determine if a current pixel region is saturated color text without having to perform a cumbersome pattern matching process.

The Examiner cites col. 7, lines 14-18 and lines 24-27 of the Lin patent as teaching the analyzing step of Claim 1. See page 6, lines 3-7 of the Office Action. Col. 7, lines 14-18 states that, "Once stored the data in gray-scale buffer 70 is then supplied to the two parallel channels (A and B) for subsequent

processing. In channel A, the gray-scale data is first thresholded (binarized) so as to produce a single binary output for each input pixel." Col. 7, lines 24-27 state that, "The threshold value preferably represents a nearly saturated value (e.g., a value of 250 on a scale of 0-255, or at least 95%) so as to assure that the continuous tone portions of the image are not inadvertently mistaken for line art and text." Appellants respectfully submit that the thresholding (or binarization) (performed at step 72), described by the Lin patent, is not halftoning, which the Lin patent distinctly describes as being performed at step 84 in Channel B of FIG. 2 for non-text-like image data.

For at least these reasons, Appellants respectfully submit that the step of "analyzing a current pixel of the halftone processed screen image data to a test criterion to determine if the current pixel is a possible saturated color text image" required by Claim 1 is not taught or suggested by the Lin patent. Further, Appellants have not found anything in the Yamaguchi patent or any other of the cited rejecting references, taken separately or in any proper combination, that is believed to teach or suggest this feature. Accordingly, Appellants respectfully submit that Claim 1 is patentable.

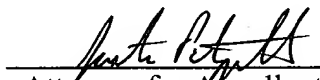
Similar to Claim 1, independent Claims 13, 20, and 21 all operate on halftone data to determine whether or not to output gray level image enhanced image data. (In particular, Claim 13 requires that the gray level of the blended *halftone screen processed* current pixel be compared relative to a threshold criterion. (emphasis added). Claim 20 requires a blending operation processor that generates a *blended halftone data* output for the current pixel; a detector for examining the current pixel after operation by the blending processor and neighboring pixels thereof after operation of the blending processor and determining if the current pixel and such neighboring pixels represent a substantially binary image file and generating a signal relative to such determination; and a selector, responsive to the signal, that selects either the gray level image enhancement processing device output or a bypass representing a blended halftone data output. (emphasis added). Claim 21 requires subjecting the blended halftone screen processed gray level current pixel to a gray level image enhanced processing modification to reduce jaggedness in an image *if the blended*

halftone screen processed gray level value current pixel is substantially a maximum density pixel or is adjusted to be a substantially maximum density pixel. (emphasis added.)) Accordingly, for at least the same reasons as discussed above with respect to Claim 1, Claims 13, 20, and 21 are believed to be patentable.

The other rejected claims in this application depend from one or another of the independent claims discussed above and, therefore, are submitted to be patentable for at least the same reasons.

In view of the foregoing remarks, Appellants respectfully request withdraw of the outstanding rejections and the allowance of the claims in the present application.

Respectfully submitted,



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Appendix I - Claims on Appeal

1. A method for processing image data comprising:

providing rasterized color separated contone gray level image data (RIP Data);

subjecting the RIP Data to halftone screen processing to form halftone processed screen image data;

analyzing a current pixel of the halftone processed screen image data to a test criterion to determine if the current pixel is a possible saturated color text image; and

if the current pixel meets the criterion for being a pixel of a possible saturated color text image selecting gray level image enhanced processing modification of the current pixel for output to a printer or display; and

if the current pixel does not meet the test criterion for being a pixel of a possible saturated color text image selecting the current pixel gray level value as processed by the halftone screen processing for output to a printer or display.

2. The method according to claim 1 wherein the gray level image data is processed independently through plural halftone screen processors and the output of the two processors are blended.

3. The method according to claim 2 wherein in the step of analyzing the current pixel and plural neighboring pixels to the current pixel are examined relative to a threshold.

4. The method according to claim 3 wherein the threshold is adjustable.

5. The method according to claim 4 wherein one of the screen processors has a screen frequency of at least 200 lines per inch.

6. The method according to claim 5 wherein a current pixel meeting the criterion of being a saturated color text image has its gray level value adjusted to a maximum value before being processed by gray level enhanced processing.

7. The method according to claim 6 wherein in gray level enhanced processing a substantially binary file is modified with gray level pixels of a density less than maximum density to provide smooth edge transitions.

8. The method according to claim 1 wherein in gray level enhanced processing a binary image file is modified with gray level pixels of a density less than maximum density to provide smooth edge transitions.

10. The method according to claim 1 wherein the rasterized image data is adjusted for color saturation according to a personal preference.

11. The method according to claim 1 wherein the image data is adjusted for color saturation according to a personal preference, analyzed for contrast and in response to analysis for contrast blending coefficients are generated and the image data that is adjusted for color saturation is independently subjected to separate halftone screen processing by the different halftone screen processings are each modified by a respective blending coefficient.

12. The method according to claim 8 wherein the resolution enhancement processor is adjustable to provide for different levels of smoothing of edges.

13. A method for processing image data comprising:

providing rasterized color separated contone gray level image data (RIP Data);

subjecting the RIP Data to plural separate halftone screen processings to form plural separate halftone screen processed gray level image data;

analyzing a current pixel of the first gray level image data for contrast index;

in response to the analyzing generating blending coefficients for processing that current pixel ;

processing the plural separate halftone screen processed image data with the blending coefficients to blend halftone screen processed gray level image data of the same current pixel to form a blended halftone screen processed gray level current pixel;

comparing the gray level of the blended halftone screen processed current pixel relative to a threshold criterion; and

if the gray level of the blended halftone screen processed current pixel meets the threshold criterion providing a gray level image enhanced processing modification of the current pixel for output to a printer or display; and

if the gray level of the blended halftone screen processed current pixel does not meet the threshold criterion providing the current pixel gray level as processed by the halftone screen processing for output to a printer or display.

14. The method according to claim 13 wherein in the step of determining if the gray level of the blended halftone screen processed current pixel meets the threshold criterion there are also examined gray levels of blended halftone screen processed neighboring pixels to the current pixel.

15. The method according to claim 14 wherein the threshold is adjustable.

16. The method according to claim 13 wherein prior to subjecting the RIP Data to plural separate halftone screen processing the gray level image data is subject to processing for gray component replacement or undercolor removal.

17. The method according to claim 16 wherein the current pixel meeting the threshold criterion has its gray level value adjusted to a maximum value before being processed by gray level enhanced processing.

18. The method according to claim 17 wherein one of the screen processors has a screen frequency of at least 200 lines per inch.

19. The method according to claim 13 wherein in gray level enhanced processing a substantially binary image file is modified with gray level pixels of a density less than maximum density to provide smooth edge transitions.

20. An apparatus for processing image data comprising:

a raster image processor for providing rasterized color separated contone gray level image data (RIP Data);

first and second halftone screen processing devices that form plural separate halftone processed screen gray level image data from the RIP Data;

an input to each of said screen processing devices to input image data representing a current gray level pixel;

a device for analyzing the current pixel for contrast index;

a device responsive to the contrast index for generating blending coefficients;

a blending operation processor that generates a blended halftone data output for the current pixel;

an input at the blending operation processor for inputting respective outputs of the first and second halftone screen processing devices and the blending coefficients;

a gray level image enhancement processing device connected to the output of the blending operation processor;

a detector for examining the current pixel after operation by the blending processor and neighboring pixels thereof after operation of the blending processor and determining if the current pixel and such neighboring pixels represent a substantially binary image file and generating a signal relative to such determination; and

a selector, responsive to the signal, that selects either the gray level image enhancement processing device output or a bypass representing a blended halftone data output.

21. A method for processing image data comprising:

providing rasterized color separated contone gray level image data (RIP Data);

subjecting the RIP Data to plural separate halftone screen processings to form plural separate halftone screen processed gray level image data;

blending halftone screen processed gray level image data of the same current pixel to form a blended halftone screen processed gray level value current pixel; and

if the blended halftone screen processed gray level value current pixel is substantially a maximum density pixel or is adjusted to be a substantially maximum density pixel subjecting the blended halftone screen processed gray level current pixel to a gray level image enhanced processing modification to reduce jaggedness in an image.

22. The method according to claim 21 wherein the plural separate halftone screen processings include a halftone screen processing employing a partial dot growth pattern and a halftone screen processing employing a mix dot growth pattern.

23. The method according to claim 21 wherein the plural separate halftone screen processings comprise a halftone screen processing suitable for a text type image and a halftone screen processing suitable for a pictorial image.

24. The method according to claim 21 wherein the plural halftone screen processed gray level image data is blended according to blending coefficients.

Appendix II – Evidence Appendix

None

Appendix III – Related Proceedings

None